

DRAFT

2030 Preferred Vision for an Integrated Transportation System

*Michigan Department of Transportation
State Long-Range Transportation Plan
2005 - 2030*



**Prepared for
The Michigan Department
Of Transportation**

November 15, 2006

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Executive Summary

Over the last year the Michigan Department of Transportation (MDOT) has been developing the 2030 State Long-Range Transportation Plan (*MI Transportation Plan*). As a part of this effort, MDOT has been consulting the public and stakeholder groups about their vision for the 2030 integrated transportation system for the state. During this period the department held two rounds of meetings with stakeholders, the public and the Economic Advisory Group, interviewed 42 key stakeholder interviews, conducted a random sample survey of 1100 households, and received 1900 responses to a general access on-line survey. All of this input was summarized into the 2030 Preferred Public Vision. The 2030 Preferred Public Vision is a transportation system oriented toward choices, access, integration, and regional sensitivity. The public sees transportation as fundamental to economic development and quality of life in Michigan. They desire a 2030 transportation system which is innovative, holistic, sustainable, environmentally sound, and energy-efficient. A comprehensive summary of the 2030 Preferred Public Vision is included in Appendix A.

The 2030 Preferred Public Vision is one of three vital inputs into the 2030 Preferred Vision for an Integrated Transportation System (the Preferred Vision). Figure 1, the Path to the Preferred Vision, shows that there are three inputs into the final vision; the 2030 Preferred Public Vision, the technical reports that have been prepared to document current conditions related to Michigan's transportation system, and deliberations by the department's Leadership Team.

In October 2006 MDOT's Leadership Team had a visioning workshop. The purpose of this workshop was to meld the public input, technical analyses and the Leadership Team expertise into the concepts for the Preferred Vision. Using a scenario planning exercise, the Leadership Team examined three very different futures for Michigan and discussed the elements of the transportation system needed to support each one. The pre-developed scenarios were based on the Preferred Public Vision and the technical reports. Using a scenario planning process allowed the Leadership Team to discuss these inputs in the context of a "real life" future. This allowed them to develop a deeper understanding of the values and characteristics of the Preferred Public Vision. The product from this workshop was a set of elements or strategies that were common among the three scenarios. Because these common strategies emerged from three starkly different scenarios they represent strategies that need to be in place to support the future transportation system under any circumstances. They are core supports for the future Integrated Transportation System. The common elements, based on the Preferred Public Vision and the technical reports, were integrated with the key values from the Preferred Public Vision to create a more detailed description of the 2030 Preferred Vision. The vision is summarized below.

The Vision

Michigan's 2030 integrated transportation system will be the foundation of the state's economic vitality and will sustain quality of life for its residents. Transportation providers throughout the state will work together to address the system's needs holistically. The entire system (all

modes) will be maintained, preserved and protected as one of the state's most important physical assets. The transportation system in 2030 will be responsive to the public's demand for more transit and non-motorized choices. Capacity improvements will be needed, but the first priority will be on making efficiency improvements (technological and/or physical) that will improve mobility and access. Safety will be a primary goal for the entire system and all its users and it will be addressed as each improvement is planned and implemented. Personal and system-wide security will be enhanced, including border security. System integration will be achieved for both passenger and freight movements through improvements in modal services and effective inter-modal connections.

MDOT will embrace technology internally and engage in technological development externally. Innovation will permeate MDOT so that the department will use innovation in every aspect of "what we build and how we build it" and every service that is provided.

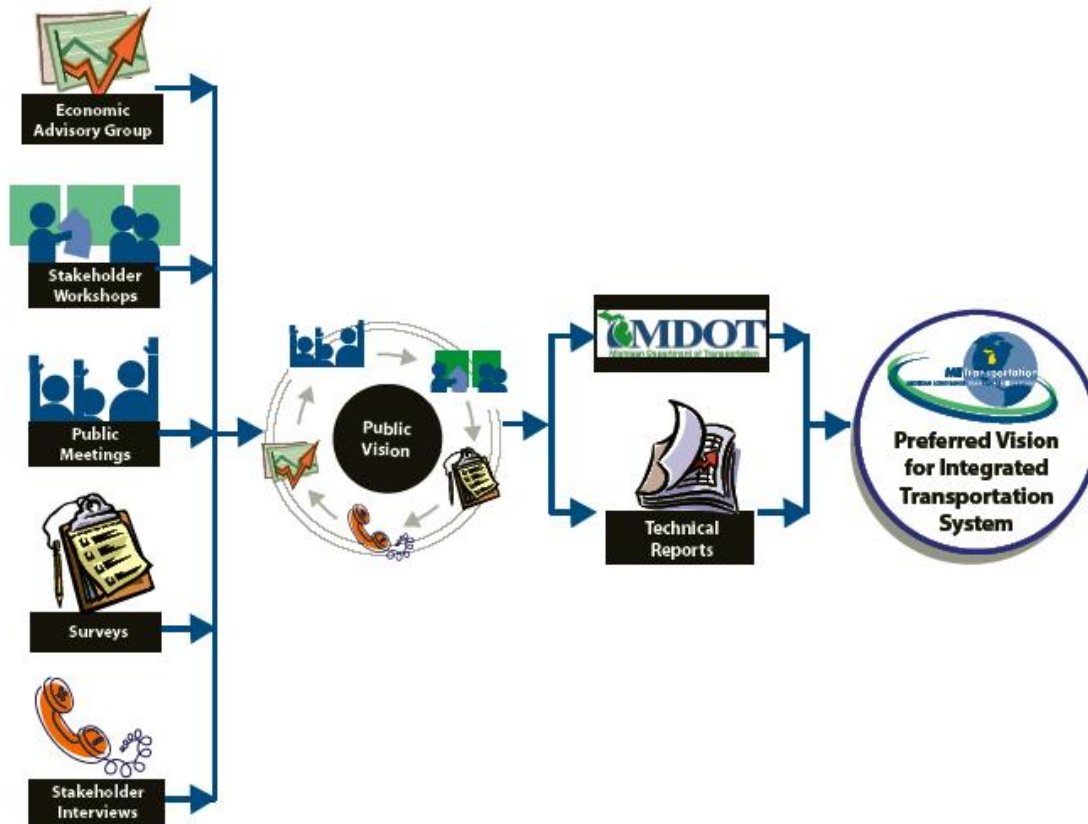
The integrated transportation system of 2030 will go beyond transportation system integration to include integration with land use, economic and environmental systems. Transportation solutions will be planned and implemented to be regionally sensitive, sustainable, and energy efficient. Infrastructure improvements will be tailored to the local community and natural setting and will be planned cooperatively so that customers and partners are satisfied with the final outcome. The need for freight and passenger movement will be balanced and the system will accommodate both without compromising goals for safety or economic competitiveness.

Transportation financing will be diversified to include new methods and techniques, but public funds will remain dedicated to transportation purposes. Funding will be flexible so that money can be allocated to meet the highest priority user needs.

Organizationally, MDOT will be an open and flexible organization. It will be responsive to customer needs and will have a transparent, accountable decision-making process. MDOT will be a proactive and adaptable organization with the capability to identify and respond to change as needed.

Figure 1

Path to the Preferred Vision



Chapter 1. Background

A vision is a description of the preferred future, capturing the best elements of the past and present that you wish to continue, and the most attractive elements of the future that you desire. The best visions change as you move toward them. For this plan the vision is long-range, out to the year 2030.

In 2003 the Michigan Department of Transportation began a statewide project called “The Transportation Summit: Connecting Michigan.” This effort involved hundreds of Michigan residents, dozens of action team meetings, public forums, and two large-scale summit meetings, held in December 2003 and again in December 2004. The summit process resulted in the publication of a long-range vision for transportation in Michigan:

“Michigan will lead the 21st century transportation revolution as it led innovation in the 20th century. We will move people and goods with a safe, integrated, and efficient transportation system that embraces all modes, is equitably and adequately funded, and socially and environmentally responsible. Michigan’s transportation community will work together to ensure that resources are in place to deliver the system.”

In 2005 the Michigan Department of Transportation (MDOT) began the development of the 2030 State Long-Range Transportation Plan (*MI Transportation Plan*). As part of the development of this plan, MDOT has sought input from the public using a variety of methods. These have included:

- Workshops with an invited Economic Advisory Group
- Two rounds of Regional Workshops with invited Stakeholders
- Interviews with invited Stakeholders
- Two rounds of Regional public open houses
- A statewide random Household Participation Study
- On-line survey

During the first round of input these groups provided their ideas for the vision for Michigan’s 2030 integrated transportation system. This information was summarized into the draft Preferred Public Vision. In the second phase of public involvement, each activity probed for feedback to the initial draft of the Preferred Public Vision and the vision was revised to reflect their comments.

Building from the broad vision statement developed as a result of the Transportation Summit, participants in the first and second rounds of public participation for the *MI Transportation Plan* discussed both the values of a preferred transportation system and the characteristics of such a system.

Values were defined as the values and principles that we want the Michigan transportation system to embody or exemplify in the future. Characteristics were defined as the specific modalities, locations, technologies, connections, and so on that make up an ideal, functioning

transportation system. The Preferred Public Vision is summarized by using the concepts of values and characteristics and a conceptual and systematic framework which has been adopted for the production of a series of technical reports. The values and characteristics are summarized in two tables which are included in Appendix A. **Table A-1** is the summary by key values and **Table A-2** is the summary of key characteristics.

Public input, however, is just one of three inputs needed for the development of the 2030 Preferred Vision. In parallel with the development of the Preferred Vision, the department has been analyzing the status of the state's transportation system and documenting the result of these analyses in a series of technical reports. Appendix B is a list of the topics covered by the technical reports which are available in their entirety at <http://www.michigan.gov/slrp>. These analyses are also a critical component in the development of the final vision. The third component of the vision is the knowledge and experience of the senior leaders of MDOT, and it is the responsibility of these senior leaders to meld the public input and the technical analyses into the final vision.

In October 2006 the Leadership Team for MDOT participated in a visioning workshop. The purpose of this meeting was to develop the concepts for the 2030 Preferred Vision. A scenario planning exercise was used. Scenario planning is a strategic planning technique that is used to develop flexible long-term plans. Scenario planning is based on the development of a number of "possible futures." These scenarios combine known facts about the future, such as demographics, geography, existing condition information, with plausible alternative social, technical, economic and political trends which are key driving forces. Scenario planning helps stimulate discussion of issues that are difficult to know or understand and prompts leaders to think beyond a simple trend line of the status quo.

Three scenarios were developed for the Leadership Team. These were developed using the Preferred Public Vision and data from the technical reports, but they were intentionally designed to reflect vastly different alternatives for the transportation system in 2030. By building these scenarios from the public input and technical data, these two components of the final vision were automatically incorporated into the discussion. The purpose of the three scenarios was not to describe what conditions in Michigan will be in 2030, but rather to provide stark contrast to stimulate the Leadership Team's discussion. The three scenarios are provided in Appendix C.

Small discussion groups reviewed each scenario and provided a summary of their view of MDOT's strategic response to the conditions described. The output of the small group discussions were presented and compared and common strategies to address each scenario were identified. After completing the discussion of all three scenarios the team identified the strategies that were common to all three. These are the essential elements of the Preferred Vision.

This scenario planning exercise allowed the Leadership Team to focus on the values of the Preferred Public Vision and to apply the values identified by the public to a “real world” situation. The results, therefore, are a deeper understanding of the individual values and an initial understanding of strategies that can be used to implement the integrated transportation system. The purpose of identifying the elements that were common to all three of these significantly different scenarios was to focus attention on the strategies that are essential to the integrated transportation system under any future circumstances.

The key characteristics included in the Preferred Public Vision provide a more tangible snapshot of the public’s current preferences for investments in the state’s integrated transportation system. These characteristics need to be validated with the public at the point in time when a investment in the system is planned. Therefore, they are not included in the final 2030 vision for Michigan’s integrated transportation system, but are retained as a part of the Preferred Public Vision to be used as an initial concept for any future improvements. The output of the Leadership Team discussions is included in Appendix C.

Chapter 2. The 2030 Preferred Vision

The final vision for the integrated transportation system is consistent with the values identified in the Preferred Public Vision, therefore, the 2030 Preferred Vision was created by melding the nine elements that were common to all of the scenarios with the Preferred Public Vision values. There are nine elements that were common to all three of the scenarios discussed by the Leadership Team. These elements are:

- The integrated system involves the entire system, all roads and modes, not just the state trunkline system. Integration goes beyond transportation to include integration of transportation with land use, economic and environmental systems.
- MDOT must be the leader in facilitating regional operations and preservation of this integrated system
- There must be a continued emphasis on safety.
- The integrated system must address the public’s demand for more transit.
- Technology and innovation are foundations of the integrated system. MDOT must embrace it internally and engage in technology development externally.
- The integrated system must capitalize on the inherent advantages of each mode to maximize the efficiency of freight movement.
- Funding is flexible so that investments match the highest priority user needs.
- Alternative financing methods are available to reduce the dependence on gas tax revenue for funding the integrated system. However, public funding sources remain dedicated to transportation and are linked to users of the system.
- MDOT is a flexible, adaptable and responsive organization.

None of the substance of the nine Public Vision values was lost in the process of integrating them with the values in the Preferred Public Vision. For the most part, the Leadership Team’s

discussions enhanced the public's views. Table 1 below shows the result of this blending. These new key values define the 2030 Preferred Vision.

Table 1: Key Values of the 2030 Vision for Michigan's Integrated Transportation System

| <i>Transportation Domain</i> | <i>Key Values</i> |
|--------------------------------|---|
| Travel Characteristics | Transportation is user-friendly and there will be better traffic flow during rush hours. In 2030, transit is as easy to use as any other mode. |
| Safety | Transportation is safe for all, with safer highways, safety for pedestrians, and a reduction in crashes of all types. |
| Security | A secure system is assumed, including borders and all modes of transportation. |
| Land Use | Community land use goals are supported and there is better linkage between transportation and land use. There is better jurisdictional coordination and cooperation on land use decisions. Regional issues are accounted for. Community growth and, where applicable, sprawl are managed. |
| Environment | The system promotes energy efficiency and is environmentally friendly. Sustainability is a key value. Facilities are aesthetic, even beautiful, and what is built is maintained. |
| Aviation | Airports have better access with more choices for traveling to them. |
| Non-motorized | Choice is provided and access to facilities is improved. |
| Intercity Passenger | Infrastructure and services are provided to tie communities together. |
| Transit | Transit is provided to meet public demand. There is choice in modes, improved intra- and inter-system connectivity, and these services are enhanced by innovation. |
| Highways, Bridges | The focus is on moving people rather than vehicles. Capacity improvements will be needed but the primary focus will be on improving system efficiencies to maximize mobility. Preservation of the system's highways and bridges will be a high priority. |
| Freight | Freight movement capitalizes on the inherent advantages of each mode for handling the commodities and there is a seamless flow of freight, which is well integrated into the system |
| Conditions, Performance | MDOT is the leader for facilitating regional operations of the transportation network and management of the system assets including focus on the overall preservation of the system. Infrastructure is artfully designed. |
| Economic Performance | The system supports and promotes economic growth and vitality in the state. The system is cost-effective. |

| | |
|----------------------------|--|
| Socioeconomics | All modes are physically and economically accessible and visitor-friendly. Michigan's technology leadership and creativity enhances all aspects of the system. |
| Finances | Funding is adequate and balanced for all modes. Investments in system expansion are balanced with the need to preserve and protect the existing infrastructure. Funding is flexible so that investments can match highest priority user needs. Alternative financing methods are available, but primary funding sources remain user based and dedicated to transportation. |
| Integration | The transportation system is connected, adaptable, and expandable. It is multi-modal and all modes are well integrated to provide seamless passenger and freight movement. |
| MDOT Organizational | MDOT will be an open and flexible organization with an enhanced ability to identify and respond to change. |

The Leadership Team discussion focused on system operations, system preservation and financing more than the public did during the development of the Preferred Public Vision. They also strengthened the role of technology and innovation. This is consistent with their responsibilities as owners of a major portion of the state's road network, financial partner for other modes, and the state's transportation experts and leaders. System preservation and operations must be a high priority for the department in order to protect the state's economic vitality and quality of life. Finally, the Leadership Team added an MDOT organizational value to the 2030 Vision.

The 2030 vision clarifies that "integration" means more than road, or even road and mode, integration. Integration with land use, economic and environmental systems is critically important to the future transportation system. The final vision also includes more focus on operating the system, including recognition that MDOT should have a leadership role in facilitating regional operations of the entire transportation network. This element of the vision acknowledges that the public really does not understand or care about the complexities of agency responsibilities for the various road and modal systems. From the customer perspective, the 2030 integrated transportation system operates seamlessly.

The Preferred Public Vision included elements for funding the system broadly, but the 2030 Preferred Vision expands on their values. It emphasizes the need for alternative funding sources and flexibility. The primary emphasis is on being able to fund the highest priority user needs for the 2030 integrated transportation system.

The Preferred Vision further strengthens the role of technology and innovation for supporting the 2030 integrated transportation system. The Leadership Team recognized that technology will play a "push-pull" role in the future. In the future technology will impact transportation

patterns and, therefore, future transportation needs may be quite different than in the past. Technology will also be a primary tool for addressing transportation deficiencies. Technology will be used as the solution of “first choice” for addressing capacity problems, and will be used to enhance operations throughout the integrated transportation system of the future.

Finally, the Preferred Vision provides insights into the MDOT of the future. In addition to emphasizing the need for the organization to “embrace technology,” the vision describes an organization that is flexible and adaptable. The organization will have the ability to identify and respond to external change and to manage necessary internal changes.

Chapter 3. Conclusion

The Preferred Vision is the foundation for the 2030 State Long-Range Transportation Plan. The Preferred Vision is based on extensive technical analysis and wide-ranging public input. It therefore represents a realistic view of what the citizens of the state expect from their future transportation system. However, MDOT can not implement this vision alone. There are many public and private partners that have a role in creating the future integrated transportation system. All of these partners must align and coordinate their decision-making for this vision to be achieved. Therefore, the Preferred Vision has a crucial role in the implementation of the *MI Transportation Plan*. It must serve as the guide and the benchmark to align the myriad of decisions by all the partners that will be required to create the integrated transportation system envisioned for 2030.

Appendix A:

Key Values and Key Attributes of the Preferred Public Vision of the Integrated Transportation System

Table A-1: Key Values of the Preferred Public Vision

| <i>Transportation Domain</i> | <i>Key Values</i> |
|--------------------------------|---|
| Travel Characteristics | Transportation is user-friendly and there will be better traffic flow during rush hours. In 2030 transit is as easy to use as any other mode. |
| Safety | Transportation is safe for all, with safer highways, safety for pedestrians, and a reduction in crashes of all types. |
| Security | A secure system is assumed, including borders and all modes of transportation. |
| Land Use | Community land use goals are supported and there is better linkage between transportation and land use. There is better jurisdictional coordination and cooperation on land use decisions. Regional issues are accounted for. Community growth and, where applicable, sprawl are managed. |
| Environment | The system promotes energy efficiency and is environmentally friendly. Sustainability is a key value. Facilities are aesthetic, even beautiful, and what is built is maintained. |
| Aviation | Airports have better access with more choices for traveling to them. |
| Non-motorized | Choice is provided and access to facilities is improved. |
| Intercity Passenger | Infrastructure and services are provided to tie communities together. |
| Transit | There is choice in modes, improved intra and inter system connectivity, and these services are enhanced by innovation. |
| Highways, Bridges | The focus is on moving people rather than vehicles, with added capacity only where needed. |
| Freight | There is a seamless flow of freight which is well integrated in the system with a focus on separating freight from passenger systems. |
| Conditions, Performance | Maintenance is a high priority with better management of system assets. Infrastructure is artfully designed. |
| Economic Performance | The system supports and promotes economic growth and vitality in the state. The system is cost-effective. |
| Socioeconomics | All modes are physically and economically accessible and visitor-friendly. Michigan's technology leadership and creativity enhances all aspects of the system. |

| | |
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| Finances | Funding is adequate and balanced for all modes. More funding options are available. |
| Integration | The transportation system is connected, adaptable, and expandable. It is multi-modal and all modes are well-integrated to provide seamless passenger and freight movement. |

Table A-2: Key Characteristics of Preferred Public Vision for the 2030 Integrated Transportation System

| <i>Transportation Domain</i> | <i>Key Characteristics</i> |
|-------------------------------|--|
| Travel Characteristics | Priority multi-modal corridors are included and these are developed to integrate with neighboring states and jurisdictions. Michigan's unique geography is considered with a desire to enhance economic competitiveness and offset disadvantages. |
| Safety | Safety is improved and congestion is reduced. |
| Security | Borders are improved and made more secure and efficient. Security is balanced with economic competitiveness. Transit security, road system security and port security are emphasized. |
| Environment | New designs are considered to minimize impacts and avoid sub-surface issues. Design standards fit each community. Energy efficiency for cars is emphasized. |
| Land Use | MDOT plays a lead role in integrating land use and transportation, assuring that land use focuses on livable communities with integrated transportation and communication systems. |
| Technology | Transportation development interacts with technology in two critical ways. The best of new technology is used to enhance efficiency, energy sustainability, cost effectiveness, safety and security. And technology leadership in the state economy is supported by transportation investments. |
| Aviation | Upper Peninsula air services are maintained. All airports are better tied to cargo and port areas for economic development. Modal options for getting to and from airports are improved. Airports are modernized, with better communication between major airports and local airports. |
| Non-motorized | Non-motorized travel is included in all transportation plans. A coordinated state and regional trail system has been developed, with access for bikes, pedestrians, and where appropriate snow mobiles. Every bridge has non-motorized lanes. Communities are developed to be more dense and walkable. |
| Intercity Passenger | Alternatives have been developed for intercity passenger traffic, specifically including high speed rail (200 mph or more) connecting |

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| | major population centers. For shorter distances, intercity trolley or light rail services are available. |
| Transit | Reliable, effective alternatives to autos assure people access to jobs and services. Public transit is aimed in part at an older and more diverse population. New development is connected to transit. Information systems enhance efficient use of transit. Transit receives a balanced financial appropriation and when choices must be made, transit receives a higher priority. |
| Highways, Bridges | Smart systems and new designs minimize impacts of roads while increasing efficiency. The current system is maintained while selected new capacity is added. East-west corridors and one or two north-south corridors are added or improved. |
| Freight | Increasing freight traffic is incorporated into the transportation system with separated systems, and better integration with ports, airports and water. |
| Operations: Conditions, Performance | What we have is maintained and optimized, with high value on improved overall system reliability. Future expansion is allowed for. Design standards account for the long term. Research leads to non-corrosive salt substitute and heated snow removal is possible. |
| Socioeconomics | There is reliable, affordable access to all transportation modes for all members of society. The whole system is re-thought and new technology is applied for innovation. An aging population is planned for, but transportation is accessible to all. |
| Finances | Longer appropriations cycles, better coordination, focused spending, and more funding options are employed. Funding options include public-private partnerships and new user fees, as opposed to increased taxes. |
| Integration | Communities, facilities, and trail systems are integrated. Roads, vehicles, and transit are in constant communication, promoting integrated transfers between modes and leading to a seamless flow of people and goods. There is better coordination of planning for communities, corridors, and access management. |

Appendix B: Technical Report Topics

The following technical reports have been prepared to support the development of the *MI Transportation Plan*. The full reports are available at <http://www.michigan.gov/slrp>.

Conditions and Performance
Corridors and Borders
Economic Outlook
Environmental
Finance
Freight
Highways and Bridges
Integration
Intercity Passenger
Land Use
MPO/RPA
Non-Motorized
Safety
Security
Socioeconomics
Transit
Travel Characteristics

Appendix C: Scenarios and Leadership Team Discussion Summary

The three scenarios prepared for the Leadership Team are provided below. These scenarios **do not** represent a prediction of probable futures for the state or for MDOT. Rather they were intentionally written to be stark descriptions of existing conditions taken from the technical reports and public input projected into the future. Following each of the scenarios are outputs of each of the six discussion groups, and common themes among the groups.

Scenario 1: We Thought Things Would Change

Driving Forces – Pre-determined Elements for All Scenarios

1. Older Population (and other demographic factors)
2. Increased cost of living, Urbanization of population
3. Better educated population, higher cost for education
4. Higher price conventional fuels
5. Pressure to respond to climate crisis
6. Technology advances lead to better safety
7. Major advances in computing, communications, Robotics developments
8. Increase in freight traffic
9. Security concerns remain through period
10. Shifting economic base, to tourism, services, technology, Decline of auto industry employment, tourism more important to economy

Critical Uncertainties – may or may not happen, may go one direction or another

- Authority centralizes at state & federal level.
- Economy of MI remains stagnant, does not reconfigure substantially, and lags behind nation.
- Transportation funding, formulas & allocation remain essentially unchanged.

It is 2:30 in the afternoon on October 18, 2030, and the streets outside my downtown apartment are noisy and busy. At the turn of the century, when I was a kid, I would have been bothered by the noise of traffic. In 2010, when I was new in the workforce then, commuting to an office, and griping about congested streets were the center of my life. At the time we thought that either technology or, in way, a lack of technology would change everything. We thought that things would change, but now we know that not all that much is different.

In 2007 the Michigan DOT published a long-range strategic plan, out to the year 2030. Among the things that were anticipated was increasing costs for conventional fuel. It was a reasonable assumption in 2006, what with crude oil over \$60 a barrel. But two things happened to expectations that the price would skyrocket, sooner than later. First, a few new fields were found, mostly off shore, in the U.S. and Africa especially. Supplies increased, even as some breakthroughs in technology made alternatives more cost competitive. It turned out that the U.S. Geological Survey was right, and a peak in supply is now not expected until 2040, and ready substitutes have driven the cost of oil back toward an inflation adjusted \$40, actually quite a bit less expensive than in 2006.

The upshot of that has been, as you would expect, the push to change out the entire transportation fleet stalled. Right now we are running about 80% of transportation on good old fashioned gas and diesel, the other 20% on alternatives. That 20% was considered an ambitious goal in 2006, but this 20% conversion has been enough to hold down gas prices and keep the old system more or less in place. There was never a change in federal tax incentives to make it otherwise.

All of the talk about changing transportation funding has been just that, mostly talk. We've done a bit of tolling, added some HOT lanes, and come up with a way to tax non-gasoline cars in a fair way. And the bottom line is that, despite occasional griping and dire warnings, the financing and allocation systems have worked well enough. Conventional fuel taxes have even grown, though at below the general inflation rate, as population and vehicle miles have grown. MDOT alternate revenue streams have made up the difference.

There was a push that began in 2007 and peaked in 2012 to further decentralize decision making and authority for transportation planning and financing. A variety of proposals were floated, for example to simply block grant a substantial portion of state revenue to local jurisdictions for use as they saw fit for transportation enhancements. These ideas were debated but generally the system that existed in 2007 has actually become more centralized, rather than the other way around, as Federal and state formulas determine investment options. This development has been driven by a determination to develop fully integrated systems, rather than a simple desire to hold on to decisions and funding.

Population in Michigan grew nearly as much as expected, almost a million people. Seventy five percent of these people settled in the Southeastern area, the rest scattered around the state in patterns that followed previous community development. Higher percentages live in urban areas. Density has increased a little, but not so much as expected.

The development of additional lane miles in urban and ex-urban areas during the decade of 2010-2020 meant that community development patterns did not change much. Improved communications and computing technology has meant more efficient public transportation (people can see on their personal wearable screens where transit vehicles are, and calculate pickup and ride times, for example). The elderly population, now more than 20 percent of the

states population, has driven up transit ridership in some communities, but not drastically. Their improved health, along with technologically superior cars has meant increased safety for older drivers, and the elder driving population is greater than ever.

Climate change and global warming became more apparent over the years, and both federal and state law has encouraged more energy efficiency. There was significant demand state wide for DOT resources to be devoted to non-motorized means of travel. This demand has been responded to, particularly with increased bike lanes on wider shoulders, and state support to local jurisdictions for building sidewalks and encouraging walkable community development. Improved coordination with land use planning has been fundamental to making this possible. All that being said, it has not been an outrageous investment, and improvements are more incremental than transformational.

A great deal of attention has been paid to freight traffic during the last 20 years, due to the doubling of in-state freight traffic. An effort was made in the 2010-2015 period to build and experiment with barrier-separated freight-ways on some of Michigan's freeways. This proved to be too expensive however, and the trial systems were converted to more general use lanes after 2012. The idea of shifting freight to trains just never gained much market support. Trains still haul mostly bulk commodities, along with a little of that on water. Trucks still haul the vast majority of goods, local, intra and interstate.

Improved communication systems between vehicles (anti-crash radar, intersection warning systems, etc.) have drastically reduced accidents involving cars and trucks. Congestion due to freight traffic is bad, in fact slightly worse than in 2006, but the cost –benefit calculations just never allowed for much change, and we live with what we have.

Several technology advances have benefited the maintenance of the current system. Nanotechnology, which seemed rather exotic in 2006, has led to lighter and stronger concrete that is quicker to build and install. This has reduced the cost of building new lane miles, and most especially has enabled an orderly pace to replacing obsolete highway bridges. The cost of doing both, which seemed impossible in 2006, has turned out to be manageable. Robotic systems for street cleaning and repair have been put into use, and also serve to cut costs.

The Michigan economy has not changed or grown as much as hoped in 2006. The mixed signals sent by the energy markets kept the auto industry in a start-stop pattern for two decades. They just never seemed to be able to figure out whether to maintain the status quo, or to shift radically to newer vehicle technologies, and the fits and starts that resulted meant that we all witnessed a gradual but steady decline in auto company employment and financial success. All of the majors now are shells of what they once were as foreign players dominate.

The service economy, new technologies, and tourism all grew, but at a pace slower than hoped for. The massive northern forest die off of 2015-2025 has not helped those local communities and their tourism industry. Warmer weather has somewhat balanced things by extending the

summer seasons. We do have our eye on the forecast for possible severe winter weather brought on if the great melt-lake of Greenland were to spill into the Northern Atlantic all at once. No one knows when this might happen, if it does. We hope and keep our fingers crossed.

(Author: Glen Hiemstra, 2006)

Discussion Question for MDOT Leadership Team:

If the features of this scenario more or less came to pass, what would be *the preferred strategic directions* for the Michigan DOT beginning in 2007?

Scenario 1 Discussion Summary Points

- Table 1
 - Change funding levels
 - Freight distribution to other modes
 - Quality of life
 - Work with business/industry to develop smart technology
- Table 2
 - Flexible transit services
 - Maintain industry partnerships (auto)
 - Safety issues associated with urban population
 - Integration of services (connecting modes, integrating services within MDOT)
 - Efficiency of infrastructure to facilitate freight
- Table 3
 - Balance investments between preservation and expansion
 - Congestion (freight and passenger)
 - Transit leadership
 - Innovation in technology
 - Funding formulas
- Table 4
 - Revenue streams
 - Expand freight share of revenues
 - Shift peak travel of freight in peak hours with pricing
 - Shift from truck to rail
 - Fund transit through user fees
 - Change Act 51
 - Improve local transportation planning
- Table 5
 - Preservation vs. expansion – innovative ways
 - Operate system optimization
 - Congestion through freight solutions
 - Solve SE MI issues – transit
 - Economic development support
 - Recognize changing demographics

- Table 6
 - Congestion relief
 - Statewide system

Group Summary: Common Elements from Individual Discussions

- Funding
- Dealing with freight
- Quality of life (congestion, mobility)
- Technology cooperation
- Choices (transit) and integration
- Balance investment (preservation and expansion)

Scenario 2: Frugal Future

Driving Forces – Pre-determined Elements for All Scenarios

1. Older Population (and other demographic factors)
2. Increased cost of living, Urbanization of population
3. Better educated population, higher cost for education
4. Higher price conventional fuels
5. Pressure to respond to climate crisis
6. Technology advances lead to better safety
7. Major advances in computing, communications, Robotics developments
8. Increase in freight traffic
9. Security concerns remain through period
10. Shifting economic base, to tourism, services, technology, Decline of auto industry employment, tourism more important to economy

Critical Uncertainties – may or may not happen, may go one direction or another

- Economy of MI turns around, reconfigures, and grows.
- Federal support for transportation & transit lags, as Federal deficit grows.
- Transportation funding, formulas & allocations change to reflect alternative fuels, electric vehicles, transit, etc.

It is 2:30 in the afternoon on October 18, 2030, and the streets outside my downtown apartment are quiet. At the turn of the century, when I was a kid, I would have been bothered by the noise of traffic. Even in 2010, the year before everything really began to change, traffic would have

been a very big deal. I was new in the workforce then, commuting to an office, and griping about congested streets.

Today mostly what I see are people on bikes, others on foot, a few people in plug-in electric cars or altfuel cars. Strangely you still see many traditional cars around. It's just that most of them don't run any more. There is basically no gasoline to be had on the open market now. What fuel exists is reserved for national defense. Most old cars are parked in driveways and garages (hoping for a miracle?), but some were just left on the side of the road when they ran out of gas.

"What happened," you ask? Around the turn of the century, a wave of experts cried that were running out of inexpensive crude oil, but no one really paid much attention until 2015, when actual shortages began to develop. The price of conventional oil and refined gasoline began to skyrocket then, and things happened fast. At first, people believed it was just one more cycle, just like the one of 2005-2006 when the price of crude tripled, then fell back to double its original price. Just wait a while, and all will be fine, was the general feeling.

People were still debating whether to open up protected lands and off-shore areas for drilling in the interest of national security. That debate lasted until 2017, when a new president initiated a crash program to solve the energy crisis. The program had two components: 1) conserving existing fossil fuel resources and 2) developing new technologies. But the country spent the next half-decade wrangling about whether automobiles, freight, mass transit, or airplanes would get the majority of the remaining fuel, so nothing much happened until major wells literally began running dry in 2025. By then, it was too late, and now in 2030 we are playing catch up.

It is going to take a lot of time and money to generate and deploy new technologies globally. Supposed saviors like tar sands and oil shale are limited and expensive, compared to the demand levels. Expectations that by now we'd have a national fleet of fuel cell or hybrid or ethanol or electric cars never developed as extensively as many hoped. Tax rebate programs came and went. Tremendous federal dollars went to propping up the auto industry as it struggled with change and competition. With all the investment in the standard transportation model, every hopeful sign on the energy markets was taken as an indicator that things would soon return to normal, and momentum for fundamental change was lost.

Some in society are reconciling themselves to a new order. With little fuel for vehicular transportation, most people are returning to walking and biking. You even see an occasional horse. There is a train transit within major metropolitan areas that had such systems and between some major cities by electric train. As a result, commerce has slowed in the United States and, believe it or not, has been severely curtailed between continents. The decline of global trade was begun of course by the famous simultaneous terror attacks on three ports and three border crossings, in the U.S., Europe, and Asia in 2008 just before the U.S elections.

Transportation disruption has been hard on the developed world. There is talk of re-establishing agrarian societies in some countries. This is not as far fetched as it sounds, since

many of the same regions (the European Union, Russia, China, Japan) are experiencing declining populations. We all remember expectations for a knowledge economy, but that is turning out to be difficult to sustain in the absence of globalized manufacturing.

In many ways, what once were termed developing or third-world economies are faring the best. It's not that they thrive. They remain largely as they had been at the beginning of the century, although with more mouths to feed and less modern technology available, they place greater emphasis on employing everyone in the fields.

Interestingly, Michigan has been pretty well positioned to absorb these massive changes and to offer solutions. Beginning in 2007 the DOT began to put itself and everyone in the state on notice that the transportation future would not resemble transportation as we knew it in the last half of the 20th Century and the beginning of the 21st. Several things were obvious. The population was expected to grow, from 10 to 11 million by 2030. By 2020 it was clear that this expectation was high and growth plans were scaled back. We've seen growth at about half the expected rate. But the expectation that has come true is an older population. In fact more than 20% of state's residents are now over 65 and many are much older. They are an educated group, and live mostly in urban and near urban areas. This has necessitated better investments in local transportation, and much better integration of land use planning, development, and transportation planning, so that the real needs of people for mobility are met.

Economically Michigan made a number of smart moves. Some were designed, others responded to market forces. Manufacturing employment declined to 15% of the economic base, but was replaced by services, regional tourism, and a high tech sector. The latter has been focused on energy development, and alternative vehicle technologies. It was a long struggle for these industries to survive, which began to pay off when the true extent of the energy emergency was recognized. As noted, these initiatives have not come to dominate either energy or transportation even yet. But they have generated an important new industry base in Michigan, especially in the later years as it has become clear that innovation is demanded. Agriculture in Michigan has grown, both to serve the larger local markets and in support of energy development. Adding it all up, the Michigan economy grew at a better rate than did the nation in the past two decades.

Anticipating the climate crisis and the possible emergence of alternative fuels, Michigan began in 2007 to plan for revisions in the funding methods and allocation formulas for transportation dollars. The political infighting over these issues was intense, and it was nearly 2015 before solutions began to be adopted. This has been especially important since the size of federal deficit, which just went out of control in 2001-2012, has precluded the kind of annual increases in federal dollars for transportation that we were used to. In fact, in 2015-2020 we saw an actual annual decline in federal transportation dollars coming to Michigan as the Feds were forced to get a handle on the deficit.

Freight traffic in Michigan, 70% of which was moved in trucks in 2006, changed very little into the early 2020's, despite the fall off of global trade after the border crossing attacks. The state and national economy were so dependent on the movement of freight that every effort was made to keep the system going. There was great interest in separating freight from passenger roads around the time of the 2007 plan. This has been too expensive an infrastructure investment, for the most part. Now, with the true crisis in fuel costs upon us, we are seeing less interstate traffic and the whole issue of the future of freight is unknown. More local freight seems likely, if we can deploy vehicle technologies to support that. Luckily, over the past 20 years tremendous advances in technology, including composites, computerized intersection-vehicle warning systems, on-board sensors and inter-vehicle communication have combined to practically eliminate accidents, so safety has much improved.

(Author: Glen Hiemstra, 2006

Note: sections of this scenario incorporate a scenario originally written by Bill Harris, planner, consultant and engineer.)

Discussion Question for MDOT Leadership Team:

If the features of this scenario more or less came to pass, what would be *the preferred strategic directions* for the Michigan DOT beginning in 2007?

Scenario 2 discussion

- Table 1
 - New funding model
 - Partner with industry for smart technology
 - Reinvent MI transportation model
 - Alternative fuels
 - Support modal options between activity centers
- Table 2
 - Support flexible transit, more emphasis
 - Need for technology to provide information (info, not incidents)
 - Focus on safety – especially bike/ped, transit
 - Need a different, new funding source
 - Freight movement on the interstate – not happening, need different infrastructure to handle
- Table 3
 - Need focus on local transportation/regional d-m
 - Transit focus (intercity passenger)
 - New funding mechanism
 - Alternative technologies
 - Partnerships (energy conservation, other states)
 - Security at borders

- Table 4
 - Non motorized focus
 - Agriculture dominance – alt fuels?
 - Mobility for aging pop
 - Pressure to open public land for energy exploration
 - Healthier population
- Table 5
 - 1940 scenario
 - More local focus
 - Partner with industry for new modes of transportation
 - New funding system – not user based
 - Convert system to alternative uses (bikes)
- Table 6
 - Alternative funding
 - Research into new fuels
 - Prioritizing the network – European model
 - Transit focus for efficiency

Group Summary: Common Elements from Individual Discussions

- Funding
 - Alternative fuels/cooperation in development
 - Prioritizing the system
 - Efficient uses of revenues
 - Transportation is radically different
-

Scenario 3: TechTopia**Driving Forces – Pre-determined Elements for All Scenarios**

1. Older Population (and other demographic factors)
2. Increased cost of living, Urbanization of population
3. Better educated population, higher cost for education
4. Higher price conventional fuels
5. Pressure to respond to climate crisis
6. Technology advances lead to better safety
7. Major advances in computing, communications, Robotics developments
8. Increase in freight traffic
9. Security concerns remain through period
10. Shifting economic base, to tourism, services, technology, Decline of auto industry employment, tourism more important to economy

Critical Uncertainties – may or may not happen, may go one direction or another

- Authority shifts from state to local government, including decision making, financing.
 - Economy of MI turns around, reconfigures, and grows.
 - Federal support for transportation & transit grows.
-

It is 2:30 in the afternoon on October 18, 2030, and the streets outside my downtown apartment are quiet. Quiet, but very busy. At the turn of the century, when I was a kid, I would have been bothered by the noise of traffic. Even in 2010, the year before everything really began to change, traffic would have been a very big deal. I was new in the workforce then, commuting to an office, and griping about congested streets.

Now streets in Michigan towns and cities are mostly occupied by people who are noticeable because of their tendency to wear special contact lenses or glasses, and their habit of talking to the air. And this behavior, already beginning to appear in 2006, means that here in 2030 few of the dangers of the 20th century are still relevant. Why? For the following reasons.

Electronic tags in clothing now broadcast signals which will automatically cause any car to stop (using the irresistible van-der-waals attraction of gecko-mimetic tire patches) rather than running over a child. Less sudden dangers, such as getting lost, are of little concern. Almost every member of this society is in radio-contact with several other people at all times, as well as being on-line (using voice, a virtual mouse and keyboard, and augmented reality glasses or smart-paper or clothing for an interface) and precisely located by GPS. Crime is rare, as the sensors and broadcasters on cars, clothing, etc. produce a record of almost everything that happens which is available to police if anything needs to be investigated.

The dangers of traffic are reduced by automatic enforcement of traffic laws and by the sharp reduction of traffic itself due to tele-presence. Most of the people in most of the houses and all of the offices are information workers of one kind or another, and few of their jobs are associated with any particular location. They travel to get together, but not to do basic work. The whole notion of traditional commuting has been tossed into a mixer out of which comes highly variable traffic patterns.

Vehicle traffic which is present includes private cars, only a few of which are old fashioned gasoline cars anymore. Not many of those classics remain, and not all “gas” stations have simple gasoline. Instead, what we see in the streets are a variety of aging experiments like hybrids, flex-fuel cars, and hydrogen fuel cell cars. What seems to have emerged as the market favorite are plug-in electrics, using nano-battery technology that enable a lifetime of 150,000 miles, a charge range of 500 miles and better, in very light-weight vehicles made mostly of composites and lightweight steel. In addition, entire fleets of public use vehicles are fully automated. That’s right, self-driving cars that roam city and town streets waiting for a person

to signal that they need a ride. When you enter you announce your destination, and your account is charged as you exit the car. Amazingly flexible.

This is just one of several transit alternatives which have been strongly supported by the federal government since the Climate-Lu authorization of 2012, and by each iteration of that legislation since. At that time the country had just gone through four more consecutive years of record temperatures. A series of hurricanes and wild weather events in 2010 and 2011 marked the final tipping point from discussion of global warming to emergency measures to deal with a climate crisis. It was agreed, not without argument, that the transportation bill would be the centerpiece. Heavy gasoline vehicles were heavily taxed. Light weight alternative fuel vehicles were provided major tax incentives. Carbon emissions were taxed. And transit became a focus of both research and funding.

Two areas were of special interest. One was national and regional support for a high speed train network between major metro areas. The 200+ mph train from Detroit running east and west is the result, and soon we'll see the completion of the north-south route. The second, more applicable within our urban areas, is the concentration on integrating land use, corridor development, transit oriented town centers, and perhaps most significantly information technology. It is quite easy for any person to call up a map of public vehicles and their locations, and to know immediately when you will have access and how long your trip will be. This simple ability, robustly available beginning by 2015 has changed the use of public transportation more than any single factor.

There was one development that changed transportation and community development patterns more than all the others in Michigan. That was a serious commitment to making the Detroit International – Willow Run Airport - greater Wayne County region into a new aerotropolis, a project which commenced in earnest after 2010. This project was the first in the United States that aimed to match the ambitions of megadevelopments like Dubai World, Beijing Capital City Airport, and Suvarnabhumi International Airport, the Bangkok aerotropolis that opened in 2007. When combined with regional land use planning that led to the high speed rail corridor from the aerotropolis to Detroit and beyond, the technology industry corridor that followed, and the housing developments, the aerotropolis was a key catalyst in not just reviving but jump starting the Michigan economy in ways that were hard to imagine 25 years ago.

An indispensable ingredient in enabling the aerotropolis project to go forward was a rethinking of the roles of state and local jurisdictions in transportation and planning. A complete overhaul of transportation financing, driven mostly by changes in fuel use and transportation patterns, along with a re-thinking of revenue sharing formulas and decision making responsibility meant that local areas in the state had more options when creating their transportation and community future. This is a never-ending process, as conditions continue to change with the pace of technology development that just seems to accelerate.

Michigan's primary north-south and east-west corridors have seen the new freight management systems come online in the past decade. While freight traffic did not grow as was forecast in 2007, due to enhanced local production of goods via automation, there was steady growth. More important, state and federal funding enabled the often dreamed of investment in separated freight systems. Now, specialized freight moves in self-propelled and robotic freight containers that, once loaded, flow seamlessly along these designated corridors, until they off-load into local systems. Bulk freight moves mostly by train or ship. And of course, freight is a core service of the aerotropolis.

Cheaper space access has greatly increased the number of communications satellites in orbit, limiting the need to expand terrestrial communications networks. Inexpensive fuel cells and the improvement of nanosolar and wind power have made the old electrical grid obsolete, ultimately leading to local power generation. Improved water filtration has likewise made expansion of water-distribution networks unnecessary. Other "appropriate technologies" are making waste disposal safe, and inexpensive anywhere. Urban America is going back to nature.

Ultimately, the internet, electronic tagging, nanotechnology, automation, and hydroponics may be able to replace all human labor that is not essentially creative. It is estimated that it will take another 20 years to achieve such a world.

As we look around Michigan in 2030, it is the elderly who appear to be almost entirely absent. But if you look a little more closely you will discover that they are actually far more common than they had been in 2006. Due to a combination of exercise, diet, hormonal and genetic therapies, stem-cell replacement, and improved plastic surgery the vast majority of senior citizens are indistinguishable from forty year olds, at least to the untrained eye of someone from the early 21st Century.

(Author: Glen Hiemstra, 2006

Note: sections of this scenario incorporate scenario elements for suburbs originally written by Michael Vassar, Futurist.com associate. For the story of the Detroit Aerotropolis see:

<http://www.fastcompany.com/magazine/107/aerotropolis.html>)

Discussion Question for MDOT Leadership Team:

If the features of this scenario more or less came to pass, what would be *the preferred strategic directions* for the Michigan DOT beginning in 2007?

Scenario 3 discussion

- Table 1
 - Strategy to address congestion
 - Focus on improving the system
 - Funding in place
 - Support new technology

- Invest shift to aero/transit/rail
- Table 2
 - Traveler information
 - Funding
 - Need education process for our decision-makers
 - Increase freight efficiency
 - Local decision-making is strong
- Table 3
 - Transit innovations
 - Less focus on congestion
 - LU integration
 - Re-focus funding structure
 - Fully integrated transportation and information (MDOT-i)
 - Younger, smarter employees
- Table 4
 - Re-think ROW corridor use
 - Address finance
 - Develop technology
 - Balance investments between modes
 - Coordinated LU/trans approach
- Table 5
 - Aerotropolis dominates agenda
 - LU link
 - Personal transport is different
 - Environment influences decisions
 - MDOT is marginalized
- Table 6
 - Change in DOT role
 - Communication with stakeholders
 - High speed rail
 - Shift dollars
 - Invest in technology

Group Summary: Common Elements from Individual Discussions

- Technology upgrades
- Radical changes
- Transit
- Local decision-making
- Re-define MDOT (role, purpose, emphasis)
- Difference between local d-m and local authority
- Integrate LU and transportation decisions